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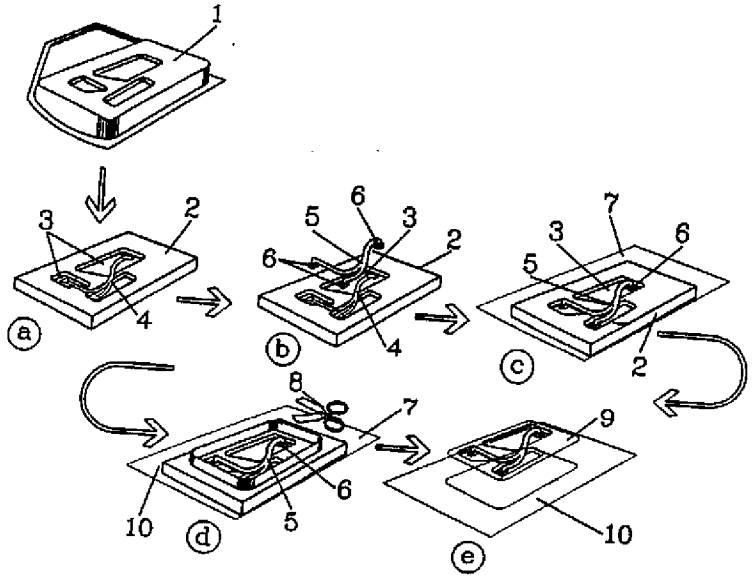
(54) Title: A METHOD FOR MOUNTING COMPONENTS IN PREDETERMINED POSITIONS



(57) Abstract

Method to amount components, such as wires, wire harnesses, vacuum hoses and the like, in determined positions, whereby the components (5, 6) are placed into a desired location on a setting table (2), whereupon at least one thin-walled carrier (7) is cut and/or formed in correspondence to the three dimensional form of the positions, and the extension of said elongated components, whereafter the carrier (7) is placed on the components (5, 6) which are fixed in the carrier (7), and that of a carrier (7) and components (5, 6) to a form stiff construction composed unit (9) is final mounted in the intended location at said positions in the product (1), which is going to be provided with said components.

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A Method for Mounting Components in Predetermined Positions

Background of the invention

The present invention refers to a method of mounting components, such as wires, harnesses, vacuum hoses and the like, possibly with related electric and/or mechanical means in predetermined positions.

At mass production of various products, which are to contain preferably elongated flexible components, such as various wires, harnesses, vacuum hoses or the like, today most frequently some form of line production is used where the installer in one or several mounting steps from a storage container brings components cut in advance and provided with connectors, e.g wire harnesses, which thereafter are going to be attached at the correct position of the product which is going to be assembled, whereby the installer by means of different fastening means, such as butyl tape, paper tape, sheet metal and plastic clips fixes the members of the component - harness and possible connectors and the like to the product, whereby it is also important that the different parts of the harness are bent and fixed so accurate in all directions, that its interconnection with components, which are going to cooperate thereby is not made difficult or impossible.

Such mounting of components of this type exist among others at assembly e.g. of cars but also at the manufacture of e.g. refrigerators, freezers, stoves and the like.

Mounting methods used until now demand a very large number of securing elements of these types, which gives a fixation of the present components in a great number of points, but in spite of this, certain portions will hang loose, and then cause squeak and rattle as thus mounted components are subjected to vibrations, which occur when the product is used, no matter if the product is a car, a refrigerator or the like.

Further it is required that the installer works with great care, so that every branching and extension of a wire harness, a vacuum hose and so forth will be placed correctly in all directions so that it is secured that every connection part obtains an exactly defined position, adapted to the position of the present consumer, which is going to be connected.

The portions of harness, hoses and the like, which in mounted position during use might be subjected to compression and abrasion against movable sheet metal parts, with the present technique has to be provided with various types of abrasive cover or protection. This means a more lengthy and a more careful handling in connection with the mounting, which is a drawback in particular at mass production.

The object of the invention and most essential features

The object of the present invention is to provide a method to eliminate the above stated drawbacks, and by which moreover a more secure and more rapid fixing of the present components in exactly correct positions, at the same time as the storing and handling costs for the components are reduced, and this has been achieved by the method being given the features stated in the characterizing part of the patent claim 1.

Description of drawings

In the following the invention will be described in closer detail with reference to an embodiment shown in the accompanying drawings.

Fig. 1 diagrammatically shows in perspective view a car door in which are to be mounted components, and an illustrated method for manufacturing of a mounting unit intended for this purpose in accordance to the method according to the present invention.

Fig. 2 illustrates in different steps made to pattern in a lateral view the main points at manufacturing of the mounting unit.

Fig. 3 shows in perspective view diagrammatically mounting of the mounting unit manufactured according to figure 1 and 2 in the car door for which it is intended.

Fig. 4 represents made to pattern a detail of the mounting according to Fig. 3.

Description of a preferred embodiment

In Fig. 1 is diagrammatically shown in perspective view a product 1, in the form of a car door, which shall be provided with a number of components, in the form of a harness with attached connectors, and in partial views designated a - e different steps are shown at the manufacture of a mounting unit according to the invention, and which is intended to be mounted in position on the car door 1.

In the partial view a is shown how with the basis of the three-dimensional form of the product 1 has formed a forming table 2, whicyh is provided with open hollow spaces 3 and grooves 4, corresponding to the three-dimensional form of the product 1 and for those components which are to be applied therein such as wire harnesses, vacuum hoses, connectors and so on, and possible grooves and /or projections to secure that the resulting mounting unit only can be mounted in a correct position on the product 1. The forming table 2 is equipped with a vacuum connection not shown in this partial figure.

In the partial view b is shown how the components, in the shown case the cabling 5 and connector 6, which are to be included in the mounting unit, is placed in corresponding recesses 3 and grooves 4, whereby the forming table 2 operates as setting table.

The partial view b shows how on top of the the forming table /setting table 2 with therein in intended positions inserted components is placed a formable foil 7, preferably a plastic foil.

Inthe partial view d is then shown how the forming table is put on a vacuum, preferably during simultaneous heating of the formable foil 7 to a plastic state, whereby this is formed after the three-dimensinal form of the forming table and thereby simultaneously partly encloses the components 5,6 so that these are fixed in foil 7 thus formed, and so eg the connectors 6 either can be placed such that they will be totally fixed or extend freely out from the formed foil 7, depending if the connector is going to have an absolutely fixed position or if it for example in order to admit inter-coupling with an associating connector, which has to be somewhat movable. In the partial view d is also shown how the formed foil 7 with therein formed components is cut clean at 8. In the partial view e finally is shown the clean cut mounting unit 9, consisting of the three-dimensionally formed foil 7 and thereto formed components 5 and 6, and cut of surplus material 10.

For heavier mounting units e.g. with more and heavier components, connectors and the like, the mounting unit 9 according to the invention can be completed with a second carrier not shown, whereby this second carrier is placed as a lid over the mounting unit and sealed to this in a suitable way, eg. by heat welding, gluing or the like. In this way a more self rigid and form stable construction is obtained than with a single carrier 7, but such a single carrier is sufficient for most applications.

In Fig. 2 is shown an end view made to a pattern manufacture of a mounting unit corresponding to the steps a, c, d and e according to Fig. 1, whereby the same reference designations have been used for the corresponding details in the diffe-

rent figures. From this figure it can be seen diagrammatically how the forming and setting table 2 is provided with vacuum connections 11, which provide the forming of the formable foil 7.

In Fig. 3 is shown in perspective view how a mounting unit 9, of essentially the type the manufacture of which is illlustrated in Fig. 1 and 2, is mounted in a car door 1. The components contained in the mounting unit in this case are constituted by a harness with connector 6, which in well defined positions as well in the plane of the door, as also in depth shopuld be possible to be interconnected with connections eg. to a current source not shown and to window lifts, loudspeakers and the like, whereby e.g. switches 12 for window lifts and loudspeakers 13 are placed in an internal panel 14, which is fixed at the inside of the door 1 after the mounting unit 9 being placed in its position in the door 1 and being fixed to this by means of a number of conventional fixing elements not shown.

Fig. 4 illustrates made to a pattern in an end view the car door 1, with the mounting unit 9 applied in present spaces therein on the internal panel 14. In the detail wiev is also shown how in the formed foil 7 by partial enclosure fixed harness 5 has its connector 6 position fixed, so that after mounting of the mounting unit 9 has an exactly defined position, which makes it easy interconnect with a corresponding connector 15 in the door 1.

Since in the case shown the connector 6 has been embedded and thereby is fixed in the carrier material 7 the interconnection with the external connector, since the installer can achieve the interconnection with one hand, since the position of the connector shown is fixed, when the mounting unit is mounted in its position. As a complement to this type of countersunk position in the carrier material, different types of conventional adhesives may be used to fix the

components.

In constructions of this type previously were used separate drain protections, to prevent water from penetrating the parts of the product, and in addition to this separate protections to protect the harnesses and hoses from mechanical abrasion, but both these previously used separate elements may be eliminated by letting the plastic foil of the mounting unit take over their functions.

Since vaccum hoses, connector means as well as harness can be fixed in mounting unit in three-dimensional accurately defined and well reproducable positions, installer dependent faults will be eliminated to a very high degree.

Further in view of storge and handling, the mounting unit regarded as a complete unit implies a considerable saving and simplification, since it can replace a number of article numbers and thereby reduce the number of articles stored and handeled.

At mounting of wire harnesses a single mounting unit can be used for several wire harnesses and hoses or the like, whereby all branchings, connectors and so on in the three dimensional extension of the carrier get an exactly defined position versus the consumers respectively.

The mounting unit is preferably but not necessarily fixed on to the product by means of clips.

It is also possible by means of modern measurement and computer technique to manufacture form dummies, which optimally uses available space in narrow and inaccesible places on the product, which are going to be provided with mounting units of this type. The form dummies then may be tested directly on the place desired, which is very time saving.

As a result of the forming table 2 simultaneously used as a

setting table, in which the mounting unit 9 remains in the same position during the whole manufacturing process, there is no need for lifting, turning and moving of the mounting unit during the manufacture.

Since the carrier 7 can be given an arbitrary, well adapted form according to the present mounting requirements, it is also possible to give the elongated components such an extension that the consumption of material and so on is minimized.

The invention is not restricted to the method and embodiment illustrated in the drawings but modifications are possible within the scope of the subsequent patent claims.

It is thus understood that the basic form of a mounting unit shown in the figures only is an example and the mounting unit canbe given any arbitrary basic form, which is required for the unit to fit the form of the space in which it is to be mounted, and even if the mounting unit has been shown adapted for a car door, it is fully possible to use the same technique for other applications and the mounting components as previously mentionmed compriseother types than harnesses and connectors, as e.g. vcuum hoses with connecting nipples and so forth.

CLAIMS

1. Method to mount components, such as wires, wire harnesses.vacuum hoses and the like, possibly with accompanying electric and/or mechanical means in certain positions, c h a r a c t e r i z e d t h e r e i n, that the components (5,6) are placed into a desired location on a setting table (2), that at least one thin-walled carrier (7) is cut and /or formed in correspondence to the three-dimensional form of the positions, and the extension of said elongated components, that the carrier (7) is placed on the components (5,6) which are fixed in the carrier (7), and that of a carrier (7) and components (5,6) to a form stiff construction composed unit (9) is final mounted in the intended location at said positions in the product (1), which is going to be provided with said components.

2. Method according to patent claim 1, wherein as a carrier (7) is used a plastically formable material, preferably plastic foil, c h a r a c t e r i z e d t h e r e i n, that the carrier (7) is brought at least partly enclose the components (5,6), whereby these at least to a part are fixed to the carrier.

3. Method according to patent claim 2, c h a r a c t e r i z e d t h e r e i n, that a carrier (7) of a heat formable plastic foil is used, and that the carrier is heated before it is brought to partly enclose the components (5,6), whereupon it is brought to cool and thereby take a form stiff state.

4. Method according to any of patent claims 1 to 3, c h a r a c t e r i z e d t h e r e i n, that a setting table is used which is designed as a vacuum forming table (2), and that the components (5, 6) is fixed to the carrier (7) by setting table put at a vacuum, which

brings the carrier (7) to be suck in towards the setting table (2) and to partly enclose the components (5,6).

5. Method according to any of preceeding patent claims, c h a r a c t e r i z e d t h e r e i n, that a second thin-walled carrier is provided with formations adapted to the formations (3) in the first carrier and therein positioned components (5,6), whereupon the second carrier is placed on the first carrier (7) and is sealed against this, so that a form stiff sandwich-element is formed with the components enclosed and fixed between the first and the second thin-walled carrier.

6. Method according to any of preceeding patent claims, c h a r a c t e r i z e d t h e r e i n, that the carrier (7) is provided with profilings, formations or the like adapted to corresponding profilings, formations or the like adapted to the corresponding profilings, formations or the like on the product (1), on which the mounting (9) is going to be finally mounted.

FIG. 1

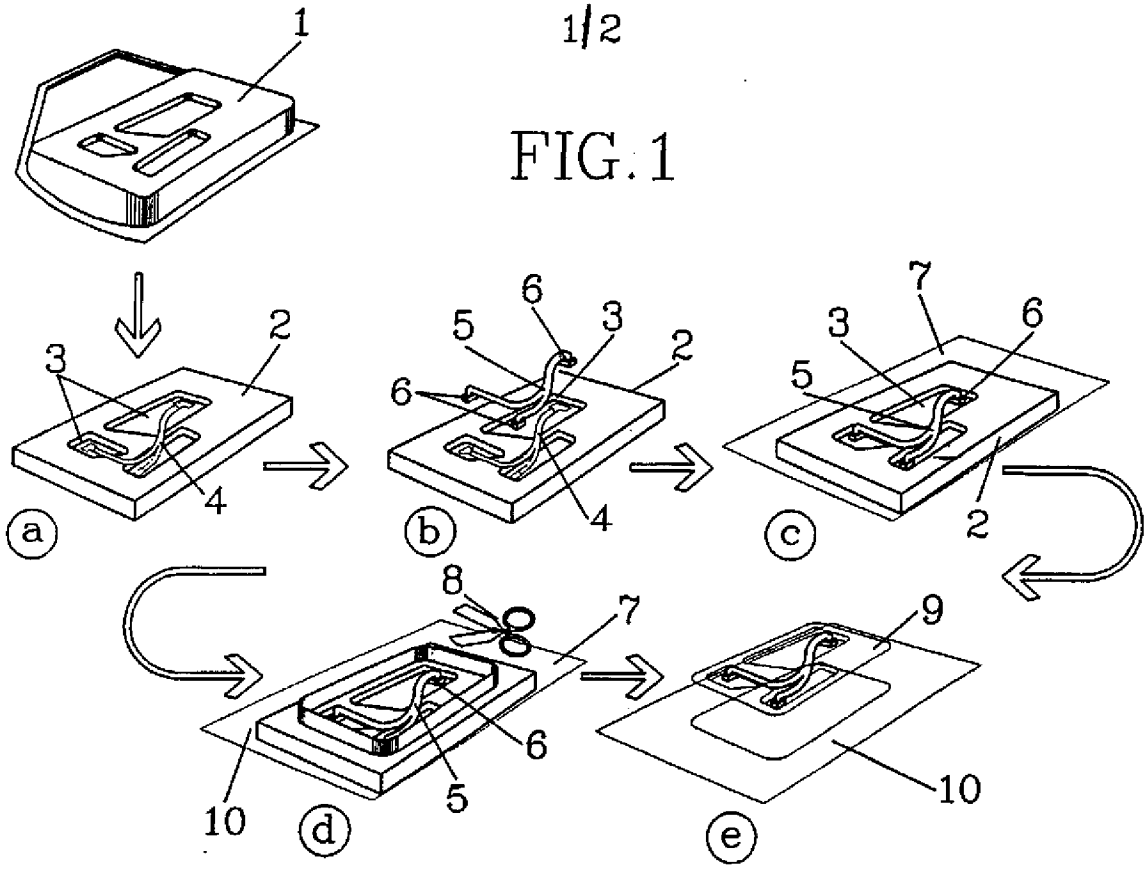


FIG. 2

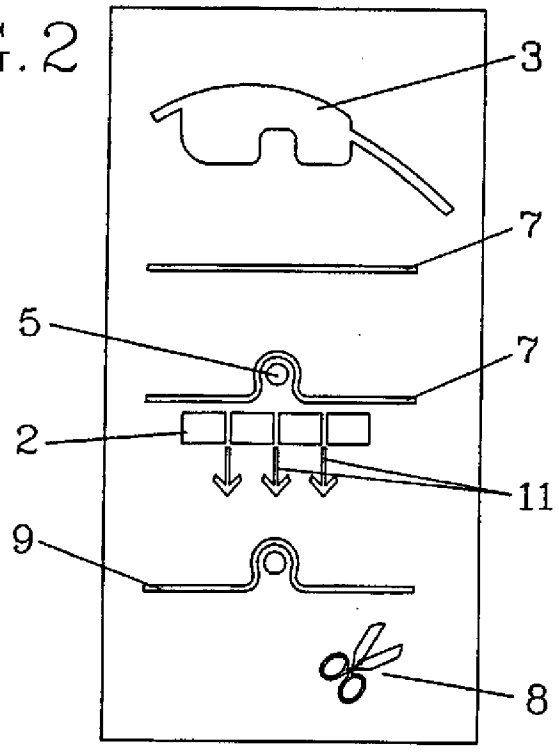


FIG. 3

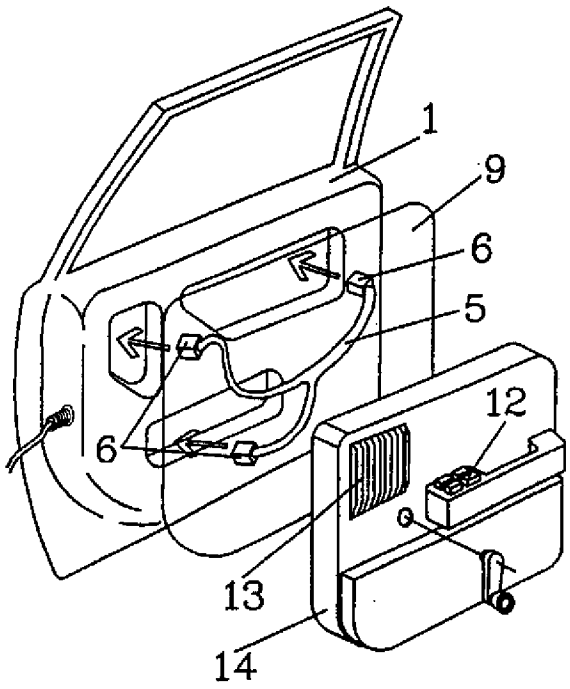
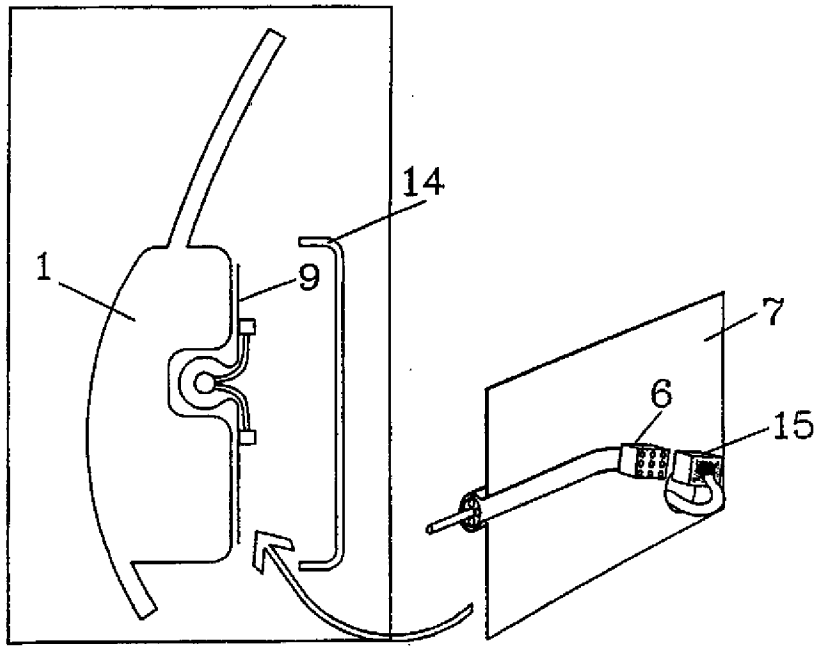


FIG. 4



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 91/00610

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 23 P 21/00, B 60 J 5/00, B 60 R 16/02

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	B 21 D; B 23 P; B 60 J; B 60 R; B 62 D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
A	US, A, 4817271 (DIETER ALTMANN ET AL.) 4 April 1989, see the whole document --	1
A	DE, A, 3441960 (AUDI AG) 28 May 1986, see page 3, line 1 - line 26; page 5, line 6 - line 9; figure 1 --	1
A	GB, A, 2164609 (YAZAKI CORPORATION) 26 March 1986, see page 5, line 93 - line 98; page 6, line 38 - line 43; figures 19,26 --	1

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28th November 1991	1991 -12- 06
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Allan Westrin

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 91/00610

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US-A- 4817271	89-04-04	NONE		
DE-A- 3441960	86-05-28	NONE		
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		AU-D-	4645585	86-02-27
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